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Superfluid Helium

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**Simulations of the lambda Transition of Helium-4 with
an Applied Heat Flow for 1 g and Reduced Gravity Environments.***

MELORA LARSON AND ULF E. ISRAELSSON, Jet Propulsion Laboratory, California Institute of Technology. ---- We report the results of simulations of a 1-dimensional helium thermal conductivity cell with copper end caps. The cell axis is taken to be parallel to the local effective gravitational field. A constant heat current Q is applied to the bottom of the cell and the temperature of the copper at the top boundary is ramped upwards so that the cell is ramped from all superfluid, to normal fluid coexisting with superfluid, and finally to all normal fluid. These simulations were designed to replicate previous experimental results that show unexpected behavior of the temperature in the middle of the cell as the normal fluid-superfluid interface passes that point. The simulations duplicate the observed behavior merely by invoking the temperature-dependence of the static and transport properties of ^4He at the L-transition. These simulations have also been extended to a reduced gravity environment which we expect to relate to current experiments using a magnetostrictive low gravity simulator.

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prefer standard session

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